

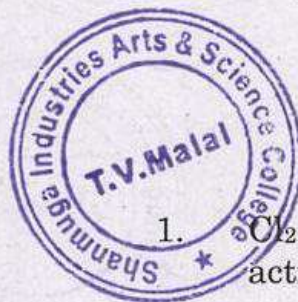
19. Deduce the theory, instrumentation and applications of Inductively coupled plasma spectroscopy.
20. Explain regarding determination of magnetic susceptibility by Gouy and Faraday method.
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NOVEMBER/DECEMBER 2025

**GECH43A/DECH43A — INORGANIC
CHEMISTRY – IV**

Time : Three hours

Maximum : 75 marks



SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Cl_2 stretching vibration is IR inactive but Raman active – Why?
2. State the basic principle of Raman spectroscopy.
3. What is the effect of paramagnetism on NMR signals? Give one example.
4. What is the principle involved in Mossbauer spectroscopy?
5. Write and explain Zeeman equation.
6. What is the source of photons used in photoelectron spectroscopy?
7. State the principle of GLC.

8. Enlist the applications of AES.
9. State the principle of Polarography.
10. Define Magnetic susceptibility.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) How is Raman spectroscopy applied to metal complexes and what are its uses?

Or

- (b) Explain uv-vis spectroscopy in metal complexes.

12. (a) Write a short note on the isotope effects on the chemical shifts of ^{19}F .

Or

- (b) What are NMR shift reagents? Explain with suitable example.

13. (a) Sketch the ESR spectrum of $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ complex and explain.

Or

- (b) State Koopman's theorem. Discuss the conditions under which the theorem breaks down.

14. (a) Discuss the theory, instrumentation and applications of AFS.

Or

- (b) Deduce the instrumentation and applications of HPLC.

15. (a) Describe the principle, advantages and applications of Laser Raman spectroscopy.

Or

- (b) Deduce the Principle, instrumentation and applications of Amperometry.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Illustrate the application of JR spectroscopy in the structural elucidation of coordination complexes.

17. Compare the chemical shift values of Fe and Sn with respect to their oxidation state.

18. What is X-ray photo electron spectroscopy? Discuss its applications in inorganic chemistry.

